



SEA-NINE™ CR2 Marine Antifouling Agent

General

SEA-NINE™ CR2 Marine Antifouling Agent is a highly effective, rapidly biodegradable marine antifouling agent, developed by Dow Microbial Control for the new generation of environmentally preferred marine antifouling paints for ships and marine structures.

SEA-NINE CR2 introduces a state-of-the-art, proprietary micro-encapsulation technology to control the release of the active ingredient. This new technology provides higher formulation flexibility, since it allows the marine antifouling agent to be used as a co-biocide to prevent soft fouling organisms only or to extend it to hard fouling control.

SEA-NINE CR2 is available as a non-dusty powder.

Physical Properties

The following are typical physical properties of SEA-NINE CR2 Marine Antifouling Agent; **they are not to be considered as product specifications.**

Appearance	Yellow-to-tan flowable powder
Flashpoint (closed up)	Not applicable
Bulk density	0.364 g/ml
Tap density	0.517 g/ml
True density	1.21 g/ml
Pmax	6.4 bar
Kst	214 bar m/s
Minimum ignition temperature (MIT).....	420-440 °C
Minimum ignition energy (MIE).....	10-25 mJ

Special Features and Benefits

- Highly effective antifouling agent against bacterial slime, algae, barnacles, tubeworms, hydroids, bryozoa, tunicates and diatoms.
- Effective in systems with reduced copper content.
- Free from heavy metals.
- Best-in-class long term efficacy.
- Stable in all major types of marine coating systems.
- Active ingredient with Global registrations including an EU BPD notification and support.

Key Environmental Characteristics

- Rapid degradation of the antifouling agent in the environment
- Effective in systems with reduced copper content.
- Minimal bioaccumulation of toxicologically significant compounds.

SEA-NINE CR2 Marine Antifouling Agent is based on the same active ingredient as SEA-NINE 211N, which received the Green Chemistry Challenge Award in the category for Designing Safer Chemical Products awarded by the United States Environmental Protection Agency.

Applications/ Directions for Use

SEA-NINE CR2 Marine Antifouling Agent can be used in all types of Antifouling Paints such as self-polishing as well as ablative technologies.

SEA-NINE™ CR2 can be applied to ship hulls (building and maintenance/repair) of commercial vessels and super yachts. The product is recommended for use in Marine (deep sea) and brackish/estuarine environments in commercial harbours, shipping lanes, and open sea.

Conditions of Application: professional and industrial users only

- Not for use by the general public in Do-It-Yourself applications
- Application by airless spraying and by brushing/rolling
- Removal by high pressure water jet and blasting

Efficacy of SEA-NINE CR2 Marine Antifouling Agent

Organism	MIC (ppm a.i.)	Organism	MIC (ppm a.i.)
Diatoms		Marine Bacteria	
<i>Amphora coffeaeformis</i>	0.4	<i>Pseudomonas atlantica</i>	0.1
<i>Amphipora paludosa</i>	8	<i>Pseudomonas nautical</i>	0.1
<i>Navicula incerta</i>	0.05		
Freshwater Green Algae		Freshwater Blue Green Algae	
<i>Chlorella pyrenoidosa</i>	0.06	<i>Anabaena flos-aquae</i>	0.3
<i>Chlorococcum oleofaciens</i>	1.0	<i>Synechococcus leopoliensis</i>	0.6
<i>Scendesmus quadricuada</i>	1.3	<i>Nostoc commune</i>	0.6
<i>Ulothrix acuminata</i>	0.6	<i>Scytonema hofmanni</i>	0.6
Marine Algae		Barnacles	LC₅₀ (ppm a.i.)
<i>Enteromorpha intestinalis</i>	0.1	<i>Balanus amphitrite</i>	0.34
<i>Ectocarpus siliculosus</i>	0.2		

Recommended Use Rates

SEA-NINE CR2 Antifouling Agent has a very broad spectrum of activity and when used in combination with cuprous oxide, it provides an excellent, cost-effective system, giving protection against all types of fouling organisms.

When used as a co-biocide with usual levels of cuprous oxide, concentrations of 2-3% of SEA-NINE CR2 (by weight) are sufficient in most applications. Exposure tests demonstrate that the amount of cuprous oxide can be reduced by 50% with an additional concentration of 2-3% of SEA-NINE CR2 (by weight) in the paint formulation.

Product stability

SEA-NINE CR2 is a flowable powder that contains approximately 90% 4,5-dichloro-2-n-octyl-4-isothiazolin-3-one. SEA-NINE CR2 is stable for at least two years at 22-25°C and 6 months at 40°C.

SEA-NINE CR2 must be added to the letdown tank during paint formulation.

Storage, Handling and Disposal

This product as supplied is corrosive and a skin sensitizer. It is, therefore, essential to take precautions to prevent skin or eye contact, ingestion or direct inhalation of such products.

Also airborne dust of this material can create a dust explosion. Therefore avoid high concentrations of dust in air and accumulation of dust on equipment.

Please refer to the Safety Data Sheet. In general, avoid eye and skin contact, wear respiratory protection, safety goggles, gloves and protective clothing.

Housekeeping

Special care should be taken to avoid contamination of surfaces or materials that may later be handled by unprotected personnel (for example door handles and taps). Should such incidental contamination take place then decontamination of the affected surfaces should be carried out by wiping down the area with 0.2% caustic.

Hygiene

After working with SEA-NINE™ CR2 Marine Antifouling Agent, personnel should wash thoroughly with soap and water. These recommendations are especially applicable before eating, drinking or smoking. All clothing that may have been contaminated with SEA-NINE CR2 should be disposed of as hazardous waste or commercially laundered in hot water with detergent and bleach before it is used again. Improper laundering can cause the clothing to remain contaminated and subject individuals to irritation or burns when clothing is reused.

Suitable materials for contact with SEA-NINE CR2 antifouling agent

When setting up handling equipment for use with SEA-NINE CR2, any of the following materials may be used for piping, tank linings, fittings and instruments, since all have been found to be compatible.

- HDPE, Polypropylene, Polyethylene Terephthalate (PET), Teflon^a
- Fluorinated high density polyethylene
- Fibreglass reinforced vinyl ester resin (DERAKANE™ 470)
- PTFE-lined steel: Glass-lined steel
- 304 SS, 316 SS
- Carbon steel (dry powder)

Neat SEA-NINE CR2 is corrosive to uncoated mild carbon steel in the presence of moisture and consequently should not come into contact with tanks or pipes of these materials for extended periods.

SEA-NINE CR2 Antifouling Agent has good thermal stability. It is however recommended that it is kept in an area approved for the storage of inflammable industrial chemicals, with containers stored upright in a well ventilated area and not exposed to extremes of temperature. Storage conditions should be in conformance with applicable legal, fire and insurance regulations. SEA-NINE CR2 is supplied in 5-50 kg drums.

Product Stewardship

Dow Microbial Control encourages its customers to review their applications of Dow Microbial Control products from the standpoint of human health and environmental quality. To help ensure that Dow Microbial Control products are not used in ways for which they are not intended or tested, Dow Microbial Control personnel are willing to assist customers in dealing with ecological and product safety considerations. Contact your representative if you need any assistance or information. When considering the use of any Dow product in a particular application, review the latest Safety Data Sheet and country-specific product label to ensure the intended use is within the scope of approved uses and can be accomplished safely. Before handling any of the products mentioned in the text, obtain available product safety information and take necessary steps to ensure safety of use.

^aTeflon is a trademark of E.I. Dupont de Nemours & CO

For further information visit our website:
www.dowmicrobialcontrol.com
or call:

United States +1-800-447-4369 (phone)
and Canada: +1-989-832-1560 (phone)
+1-989-832-1465 (fax)
Europe (Dow): +800-3-694-6367 (phone)
+32-3-450-2240 (phone)
+32-3-450-2815 (fax)
Europe (Rohm and Haas):
France: +41-81-755-46-54 (phone)
Germany: +41-81-755-46-54 (phone)
Italy: +41-81-755-46-54 (phone)
Pacific (Dow): +800-7776-7776 (phone)
+800-7779-7779 (fax)
+603-7958-3392 (phone)
+603-7958-5598 (fax)
Pacific (Rohm and Haas):
Japan: +81-3-6238-4118 (phone)
Korea: +82-2-3489-8901 (phone)
Singapore: +65-6796-6217 (phone)
Thailand: +662365-7000 (phone)
New Zealand +61-3-9272-4212 (phone)
and Australia:
Latin America: +55-11-5188-9555 (phone)
+55-11-5188-9937 (fax)
India: +91-22-2760-2504 (phone)
+91-22-2760-6899 (fax)
Other Global +1-989-832-1560 (phone)
Areas: +1-989-832-1465 (fax)

[†]except Indonesia and Vietnam

NOTICE: No freedom from any patent owned by Seller or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use and for ensuring that Customer's workplace and disposal practices are in compliance with applicable laws and other governmental enactments. Seller assumes no obligation or liability for the information in this document. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

Please note that not all products are registered in all regions for all applications. Please contact your local Dow representative for detailed technical information applicable to your individual situation.

USE BIOCIDES SAFELY. ALWAYS READ THE LABEL AND PRODUCT INFORMATION BEFORE USE.

